CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended). An assay chip for investigation of a functionality of non-lipid molecules and their interactions with molecules, comprising:

a) a nanopore substrate having a plurality of nanopores and alignment marks;

b) a substantially planar support layer deposited on said nanopore substrate and having a plurality of nanopores corresponding to and aligned with said nanopores of said nanopore substrate;

c) a biologically effective layer configured to host at least one of a non-lipid molecule and a biologically functional molecule, deposited on said support layer and covering the plurality of nanopores, resulting in accessible nanopores from both sides of the biologically effective layer for measurements, wherein the biologically effective layer is a biomembrane isolated from one of prokaryotic and eukaryotic cells, and wherein the biologically effective layer is a lipid bilayer formed by preparation and later fusion of lipid vesicles or is a functional layer of supramolecular assembly.

Claim 2 (previously presented). The assay chip according to claim 1, wherein a surface of the support layer is chemically modified by at least one of activated hydrophobic and hydrophilic silanes resulting in a support promotion layer.

Claim 3 (previously presented). The assay chip according to claim 1, wherein the support layer is selected from the group consisting of silicon nitride (Si_3N_4) and silicon oxide substrate, and wherein the substrate is selected from the group consisting of silicon and carbon containing materials, polymers, metals, dielectrica, glass and ceramics.

Claim 4 (previously presented). The assay chip according to claim 1, wherein a thickness of the substrate and a diameter of the nanopores is chosen in order to have an aspect ratio in the range of 0.25 to 5.

Claim 5 (previously presented). The assay chip according to claim 4, wherein the diameter of the nanopores is in the range of 50 to 2000 nm.

Claim 6 (previously presented). The assay chip according to claim 1, wherein said nanopores are arranged in a plurality of nanopore array sections having an area in the range of 1×10^{-6} mm^2 to 1 mm^2 on a total free standing silicon nitride membrane area of 1×10^{-6} mm^2 to 10 mm^2.

Claim 7 (previously presented). The assay chip according to claim 1, wherein said nanopores have a distance from each other in the range of 0.5 to 5-times of their diameter.

Claim 8 (cancelled).

Claim 9 (previously presented). The assay chip according claim 1, wherein the non-lipid molecules are from a natural source selected from the group consisting of eukaryotes and prokaryotes.

Claim 10 (previously presented). The assay chip according to claim 1, wherein the biologically effective layer hosts a non-lipid molecule, and wherein the non-lipid molecule is a synthetic compound.

Claim 11 (previously presented). The assay chip according to claim 1, wherein the biomembrane and the lipid bilayer each comprise at least one of a non-lipid and functional molecule, whereby the functional molecule is produced using one of recombinant DNA and RNA technologies.

Claim 12 (previously presented). The assay chip according to claim 1, wherein the biologically effective layer is made from at least one intact living cell.

Claim 13 (withdrawn). A process for analyzing the functionality of a non-lipid molecule or functional molecule (3), being integrated in a biological effective layer (4) of the assay chip according to any one of the preceding claims 1 to 12, comprising:

applying a fluid containing a binding compound (14, 22) to one side of the fluid biological effective layer in order to allow the binding compound (14, 22) to interact with the non-lipid molecule;

monitoring the response of the non-lipid molecule (3) induced by effector binding (14, 22) and/or the interacting of binding molecules (13) in the fluid biological effective layer by measuring physical or chemical changes on the cis- or trans-side of the assay chip (2).

Claim 14 (cancelled).

Claim 15 (cancelled).

Claim 16 (cancelled).

Claim 17 (previously presented). The assay chip according to claim 4, wherein the diameter of the nanopores is chosen in order to result with an aspect ratio in the range of 0.75 to 2.

Claim 18 (previously presented). The assay chip according to claim 5, wherein the diameter of the nanopores is in the range of 100 to 2000 nm

Claim 19 (previously presented). The assay chip according to claim 7, wherein said nanopores have a distance from each other in the range of 0.8 to 2-times of their diameter.